REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed May 2, 2005. Upon entry of this response, claims 1-25 remain pending. Reconsideration and allowance of the application and presently pending claims are respectfully requested. In addition, Applicants do not intend to make any admissions regarding any other statements in the Office Action that are not explicitly referenced in this response.

I. Rejection of claims 1-4, 9-10, 15-18 and 23 under 35 U.S.C. § 103(a)

The Office Action indicated that claims 1-4, 9-10, 15-18 and 23 are rejected under 35 U.S.C. § 103(a). In order for a claim to be properly rejected under 35 U.S.C. §103, the teachings of the prior art reference(s) must suggest all features of the claimed invention to one of ordinary skill in the art. *See, e.g., In re Dow Chemical*, 837 F.2d 469, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988); *In re Keller*, 642 F.2d 413, 208 U.S.P.Q. 871, 881 (C.C.P.A. 1981). Further, "[t]he PTO has the burden under section 103 to establish a prima facie case of obviousness. It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." *In re Fine, Minnesota Mining and Mfg.Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002).

A. Independent Claim 1 is patentable over *Dowling* in view of *Thomas*

The Office Action rejected claims 1-4 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 6,765,967 to Dowling (hereinafter referred to as "*Dowling*") in view of U.S. Patent No. 3,647,992 to Thomas (hereinafter referred to as "*Thomas*"). Applicants respectfully

traverse the rejection for at least the reason that *Dowling* in view of *Thomas* fails to disclose, teach or suggest all elements of the claimed invention.

Independent claim 1 recites:

> 1. A transceiver interface circuit configured to transmit and receive information, the circuit further configured to perform echo-cancellation, comprising:
> a digital signal processor (DSP) configured to digitally process information from a data source and to generate a transmit signal, the DSP further configured to receive and process a receive signal and a transmit error signal;
> an analog front end (AFE) coupled with the DSP, the AFE configured to modify the transmit signal, the receive signal, and the transmit error signal;
> ***a line driver coupled with the AFE, the line driver configured to amplify the modified transmit signal and to produce the transmit error signal***; and
> a hybrid network coupled with the line driver and the AFE, the hybrid network configured to transmit, via a transmission line, the amplified transmit signal output from the line driver and to forward the receive signal received from the transmission line to the AFE, the hybrid network further configured to isolate the amplified transmit signal from the receive signal.

(*Emphasis added*). The Office Action states, in relevant part:

> "*Dowling* discloses that the adaptive processor of the transceiver may be used to perform non-linear echo path modeling."

However, *Dowling*, in contrast the claimed invention, does not disclose a line driver configured to produce a transmit error signal that contains all the noise information that must be subtracted from the receive signal 137 to produce an accurate reproduction of the receive signal without any non-linear error originating from the transmit signal. Further, *Dowling* does not disclose a line driver that produces a transmit error signal that contains such information regarding a receive signal with some of the noise crossed over from the transmit signal caused by non-linear error.

Applicants refer to *Thomas*, col. 5, which discloses a system that "develops signals w_1, w_2 – w_n from signals $x(t)$ supplied from ***incoming circuit***." (*Emphasis added*). Further, these signals are "delivered to adaptive networks 18, $18_{(2)}$, - $18_{(n)}$ where they are adjusted in accordance with an error signal ***derived from*** the composite output signal ***appearing in circuit***

30." (*Emphasis added*). In contrast, the claimed invention teaches ***a line driver*** configured to amplify the modified transmit signal ***and to produce the transmit error signal.*** Further, in contrast with the claimed invention, the isolating amplifier 13 in FIG. 1 of *Thomas* appears to teach an isolating amplifier with an input and an amplified output, but the isolating amplifier 13 does not teach producing a transmit error signal in addition to an amplified output. Unlike the claimed invention, *Thomas* does not teach ***a line driver configured to amplify the modified transmit signal and to produce the transmit error signal.***

In light of the above statements, Applicants respectfully submit that *Dowling* in view of *Thomas* do not disclose, teach or suggest all of the claimed elements, and for at least this reason claim 1 is patentable over the reference.

B. Claims 2-4 are patentable over *Dowling* in view of *Thomas*

The Office Action rejected claims 2-4 as allegedly unpatentable over *Dowling* in view of *Thomas*. Applicants respectfully traverse the rejection for at least the reason that *Dowling* in view of *Thomas* fails to disclose, teach or suggest all elements of the claimed invention. Dependent claims 2-4 are allowable for at least the reason that these claims depend from allowable independent claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants submit that the rejection of claims 2-4 be withdrawn.

C. Claims 9-10 are patentable over *Dowling* in view of *Thomas*

The Office Action rejected claims 9-10 under 35 U.S.C. § 103(a) as allegedly unpatentable over *Dowling* in view of *Thomas*. The Office Action stated that independent claim 9 stands rejected for the same reasons as independent claim 1. Applicants respectfully traverse

the rejection for at least the reason that *Dowling* in view of *Thomas* fails to disclose, teach or suggest all elements of the claimed invention. Claim 9 recites:

> 9. A transceiver interface circuit comprising:
> means for digitally processing information from a data source and transmitting the information via a transmit signal, the digital signal processing means receiving and digitally processing a receive signal and a transmit error signal;
> means for converting an analog signal into a digital signal and converting a digital signal into an analog signal;
> means for amplifying the transmit signal for transmission via a transmission line, ***the amplification means producing a transmit error signal generated by the amplification of the transmit signal***; and
> means for isolating the transmit signal from a receive signal received via a transmission.

(*Emphasis added*). *Dowling*, in contrast to the claimed invention, does not disclose an amplification means producing a transmit error signal that contains all the noise information that must be subtracted from the receive signal 137 to produce an accurate reproduction of the receive signal without any non-linear error originating from the transmit signal. Further, *Dowling* does an amplification means that produces a transmit error signal that contains such information regarding a receive signal with some of the noise crossed over from the transmit signal caused by non-linear error.

Applicants refer to *Thomas*, col. 5, which discloses a system that "develops signals w_1, w_2 – w_n from signals $x(t)$ supplied from ***incoming circuit.***" (*Emphasis added*). Further, these where they are adjusted in accordance with an error signal ***derived from*** the composite output signal ***appearing in circuit 30.***" (*Emphasis added*). In contrast, the claimed invention teaches an amplification means ***producing a transmit error signal generated by the amplification of the transmit signal.*** Further, in contrast with the claimed invention, the isolating amplifier 13 in FIG. 1 of *Thomas* appears to teach an isolating amplifier with an input and an amplified output, but does not teach producing a transmit error signal in addition to an amplified output. Unlike

the claimed invention, *Thomas* does not teach a means for amplifying the transmit signal that also ***produces a transmit error signal.***

In light of the above statements, Applicants respectfully submit that *Dowling* in view of *Thomas* do not disclose, teach or suggest all of the claimed elements, and for at least this reason claim 9 is patentable over the reference. Furthermore, the Office Action rejected dependent claim 10 as allegedly unpatentable over *Dowling* in view of *Thomas*. Dependent claim 10 is allowable for at least the reason that this claim depends from allowable independent claim 9. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 9 and 10 be withdrawn.

D. Claims 15-18 are patentable over *Dowling* in view of *Thomas*

The Office Action rejected claims 15-18 under 35 U.S.C. § 103(a) as allegedly unpatentable over *Dowling* in view of *Thomas*. The Office Action stated that independent claim 15 stands rejected for the same reasons as independent claim 1. Applicants respectfully traverse the rejection for at least the reason that *Dowling* in view of *Thomas* fails to disclose, teach or suggest all elements of the claimed invention. Claim 15 recites:

> 15. A system for performing echo cancellation, comprising:
> a digital signal processor (DSP) configured to digitally process information from a data source and to transmit the information via a transmit signal, the DSP further configured to receive and digitally process a transmit error signal; and
> ***a line driver*** in communication with the DSP via an analog front end (AFE) and ***configured*** to amplify the transmit signal and ***to produce the transmit error signal that is delivered to the DSP via the AFE.***

(*Emphasis added*). *Dowling*, in contrast to the claimed invention, does not disclose a line driver configured to produce a transmit error signal that contains all the noise information that must be subtracted from the receive signal 137 to produce an accurate reproduction of the receive signal

without any non-linear error originating from the transmit signal. Further, *Dowling* does an amplification means that produces a transmit error signal that contains such information regarding a receive signal with some of the noise crossed over from the transmit signal caused by non-linear error.

Applicants refer to *Thomas*, col. 5, which discloses a system that "develops signals w_1, w_2 – w_n from signals *x(t)* supplied from ***incoming circuit.***" (*Emphasis added*). Further, these signals are "delivered to adaptive networks 18, $18_{(2)}$, - $18_{(n)}$ where they are adjusted in accordance with an error signal ***derived from*** the composite output signal ***appearing in circuit 30.***" (*Emphasis added*). In contrast, the claimed invention teaches ***a line driver*** configured to amplify the transmit signal ***and to produce the transmit error signal.*** Further, in contrast with the claimed invention, the isolating amplifier 13 in FIG. 1 of *Thomas* appears to teach an isolating amplifier with an input and an amplified output, but does not teach producing a transmit error signal in addition to an amplified output. Unlike the claimed invention, *Thomas* does not teach ***a line driver configured to amplify the transmit signal and to produce the transmit error signal.***

In light of the above statements, Applicants respectfully submit that *Dowling* in view of *Thomas* do not disclose, teach or suggest all of the claimed elements, and for at least this reason claim 15 is patentable over the reference. Furthermore, the Office Action rejected dependent claims 16-18 as allegedly unpatentable over *Dowling* in view of *Thomas*. Dependent claims 16-18 are allowable for at least the reason that these claims depend from allowable independent claim 15. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 16-18 be withdrawn.

E. Claim 23 is patentable over *Dowling* in view of *Thomas*

The Office Action rejected claim 23 under 35 U.S.C. § 103(a) as allegedly unpatentable over *Dowling* in view of *Thomas*. The Office Action rejected claim 23 as a method performed by the system of the claim 9 rejection. Applicants respectfully traverse the rejection for at least the reason that *Dowling* in view of *Thomas* fails to disclose, teach or suggest all elements of the claimed invention. Applicants reiterate statements made in reference to independent claim 9 and respectfully submit that claim 23 is allowable for at least the same reasons.

II. Rejection of claims 5-8, 11-14, 19-22, 24, and 25 under 35 U.S.C. § 103(a)

The Office Action rejected claims 5-8, 11-14, 19-22, 24, and 25 under 35 U.S.C. § 103(a) as allegedly unpatentable over *Dowling* in view of *Thomas* as applied to claims 1, 9, 15, and 23 and further in view of U.S. Patent No. 6,226,322 to Mukherjee (hereinafter referred to as *Mukerjee*). Applicants respectfully traverse the rejections for at least the reason that *Dowling* in view of *Thomas* and further in view of *Mukerjee* fails to disclose, teach or suggest all elements of the claimed invention.

As a separate and independent basis for the patentability of these claims, Applicants traverse the rejections for failing to identify a proper basis for combining *Dowling, Thomas*, and *Mukherjee*. In combining these references, the Office Action stated only that "it would have been obvious to one of ordinary skill in the art at the time of this application that the line drivers in Dowling's system could be implemented differentially for the advantage of the common mode rejection that is inherent to differential signaling." *Office Action*, page 4.

It is well-settled law that in order to properly support an obviousness rejection under 35 U.S.C. § 103, there must have been some teaching ***in the prior art*** to suggest to one skilled in the art

that the claimed invention would have been obvious. *W. L. Gore & Associates, Inc. v. Garlock Thomas, Inc.*, 721 F.2d 1540, 1551 (Fed. Cir. 1983). More significantly,

> "The consistent criteria for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ..." **Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure...** In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill in the art is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention."

(*Emphasis added.*) *In re Dow Chemical Company*, 837 F.2d 469, 473 (Fed. Cir. 1988).

In this regard, Applicants note that there must not only be a suggestion to combine the functional or operational aspects of the combined references, but that the Federal Circuit also requires the prior art to suggest both the combination of elements and the structure resulting from the combination. *Stiftung v. Renishaw PLC*, 945 Fed.2d 1173 (Fed. Cir. 1991). Therefore, in order to sustain an obviousness rejection based upon a combination of any two or more prior art references, the prior art must properly suggest the desirability of combining the particular elements to derive an AFE device, as claimed by the Applicants.

When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references. *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1579, 42 USPQ2d 1378, 1383 (Fed. Cir. 1997) (also noting that the "absence of such a suggestion to combine is dispositive in an obviousness determination").

Evidence of a suggestion, teaching, or motivation to combine prior art references may flow, *inter alia*, from the references themselves, the knowledge of one of ordinary skill in the art, or from the nature of the problem to be solved. *See In re Dembiczak*, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Although a reference need not expressly teach that the

disclosure contained therein should be combined with another, the showing of combinability, in whatever form, must nevertheless be "clear and particular." *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617.

If there was no motivation or suggestion to combine selective teachings from multiple prior art references, one of ordinary skill in the art would not have viewed the present invention as obvious. *See In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); *Gambro Lundia AB*, 110 F.3d at 1579, 42 USPQ2d at 1383 ("The absence of such a suggestion to combine is dispositive in an obviousness determination.").

Significantly, where there is no apparent disadvantage present in a particular prior art reference, then generally there can be no motivation to combine the teaching of another reference with the particular prior art reference. *Winner Int'l Royalty Corp. v. Wang*, No 98-1553 (Fed. Cir. January 27, 2000). For at least the reason that the Office Action failed to identify proper motivations or suggestions for combining the various references to properly support the rejections under 35 U.S.C. § 103, those rejections should be withdrawn. The claims are further addressed in more detail below.

A. Claims 5-8 are patentable over *Dowling* in view of *Thomas* and further in view of *Mukherjee*.

Applicants respectfully submit that dependent claims 5-8 are allowable for at least the reason that these claims depend from allowable independent claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 5-8 be withdrawn.

B. Claims 11-14 are patentable over *Dowling* in view of *Thomas* and further in view of *Mukherjee*.

Applicants respectfully submit that dependent claims 11-14 are allowable for at least the reason that these claims depend from allowable independent claim 9. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 11-14 be withdrawn.

C. Claims 19-22 are patentable over *Dowling* in view of *Thomas* and further in view of *Mukherjee*.

Applicants respectfully submit that dependent claims 19-22 are allowable for at least the reason that these claims depend from allowable independent claim 15. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 19-22 be withdrawn.

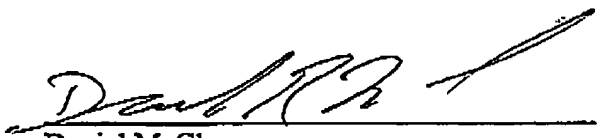
D. Claims 24 and 25 are patentable over *Dowling* in view of *Thomas* and further in view of *Mukherjee*.

Applicants respectfully submit that dependent claims 24 and 25 are allowable for at least the reason that these claims depend from allowable independent claim 23. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Accordingly, Applicants respectfully request that the rejection of claims 24 and 25 be withdrawn.

CONCLUSION

Applicants respectfully submit that all pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,



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